Roger S. Sampson
(510) 843-6200

Fig. 1A

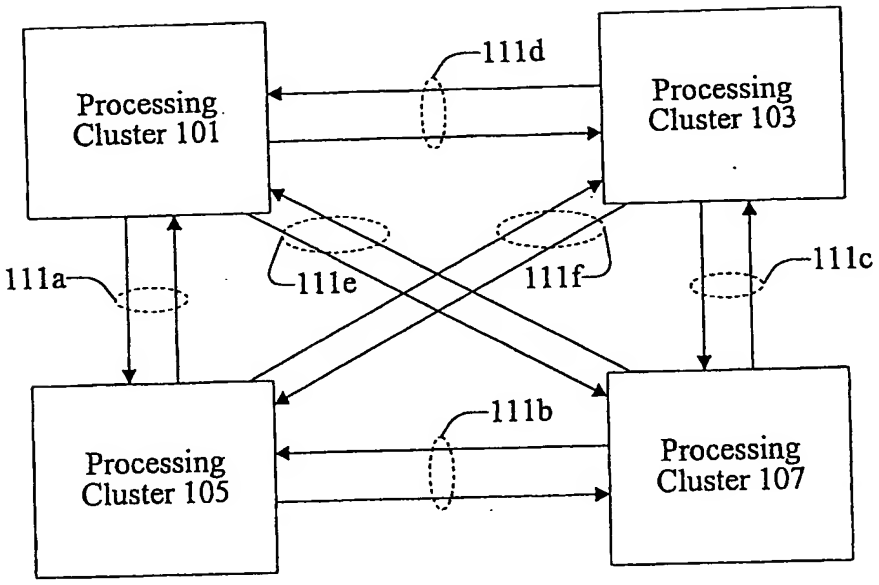
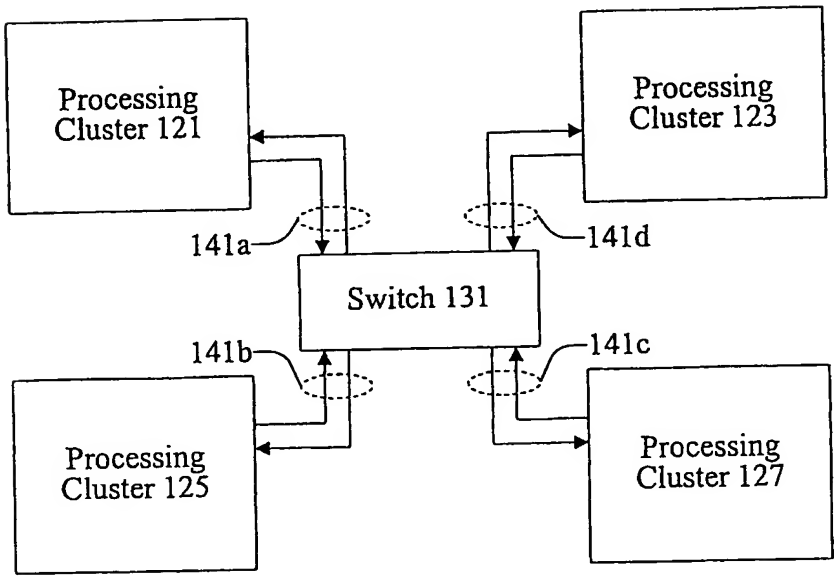
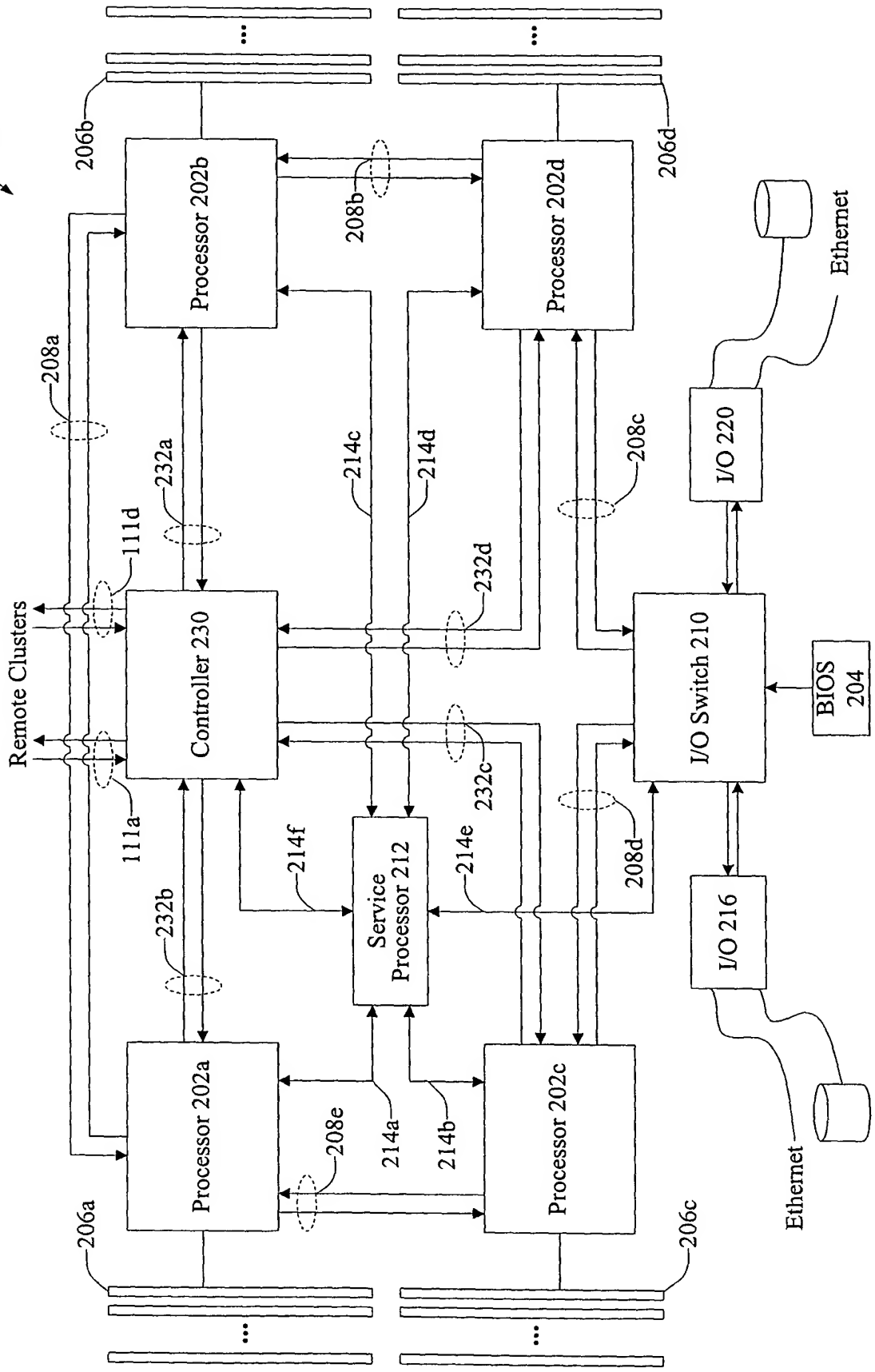


Fig. 1B



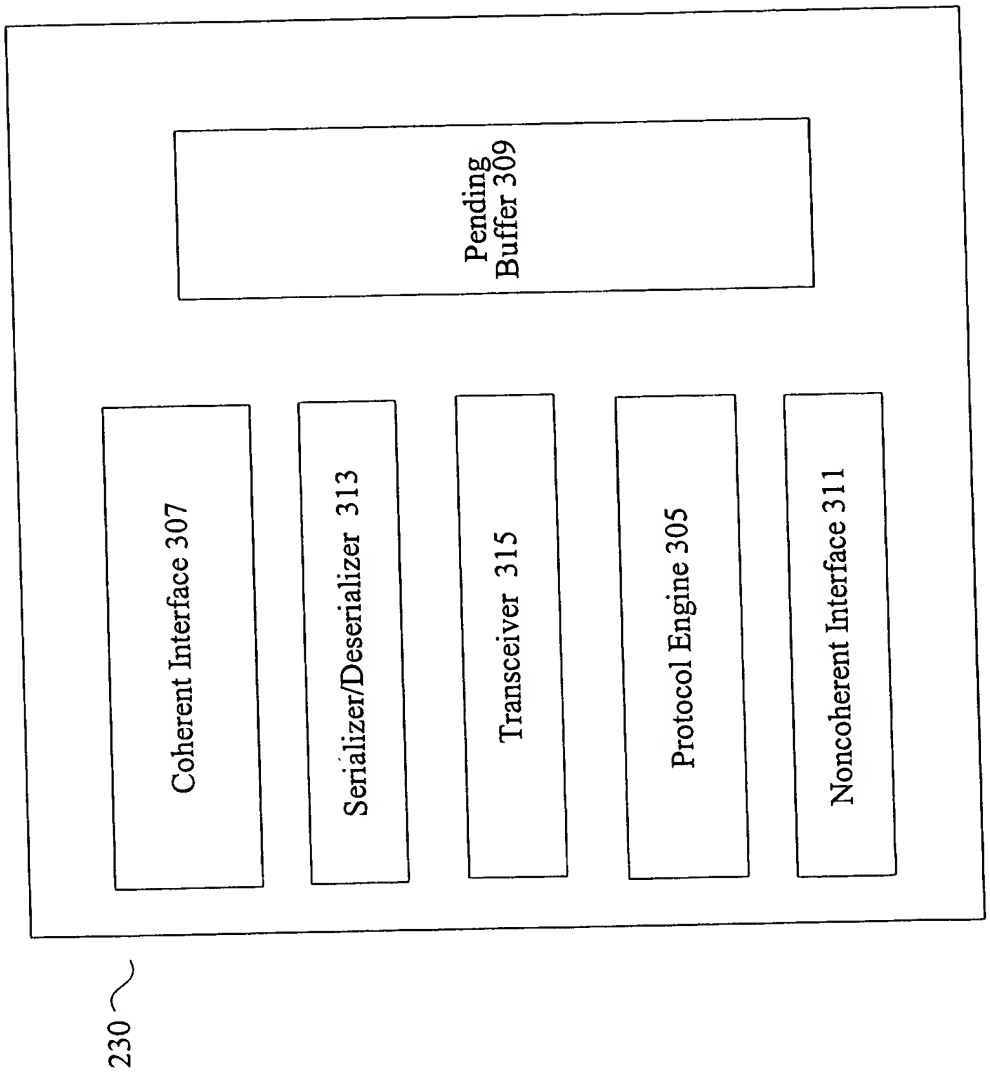
Roger S. Sampson
(510) 843-6200

Fig. 2



Roger S. Sampson
(510) 843-6200

Fig. 3



Roger S. Sampson
(510) 843-6200

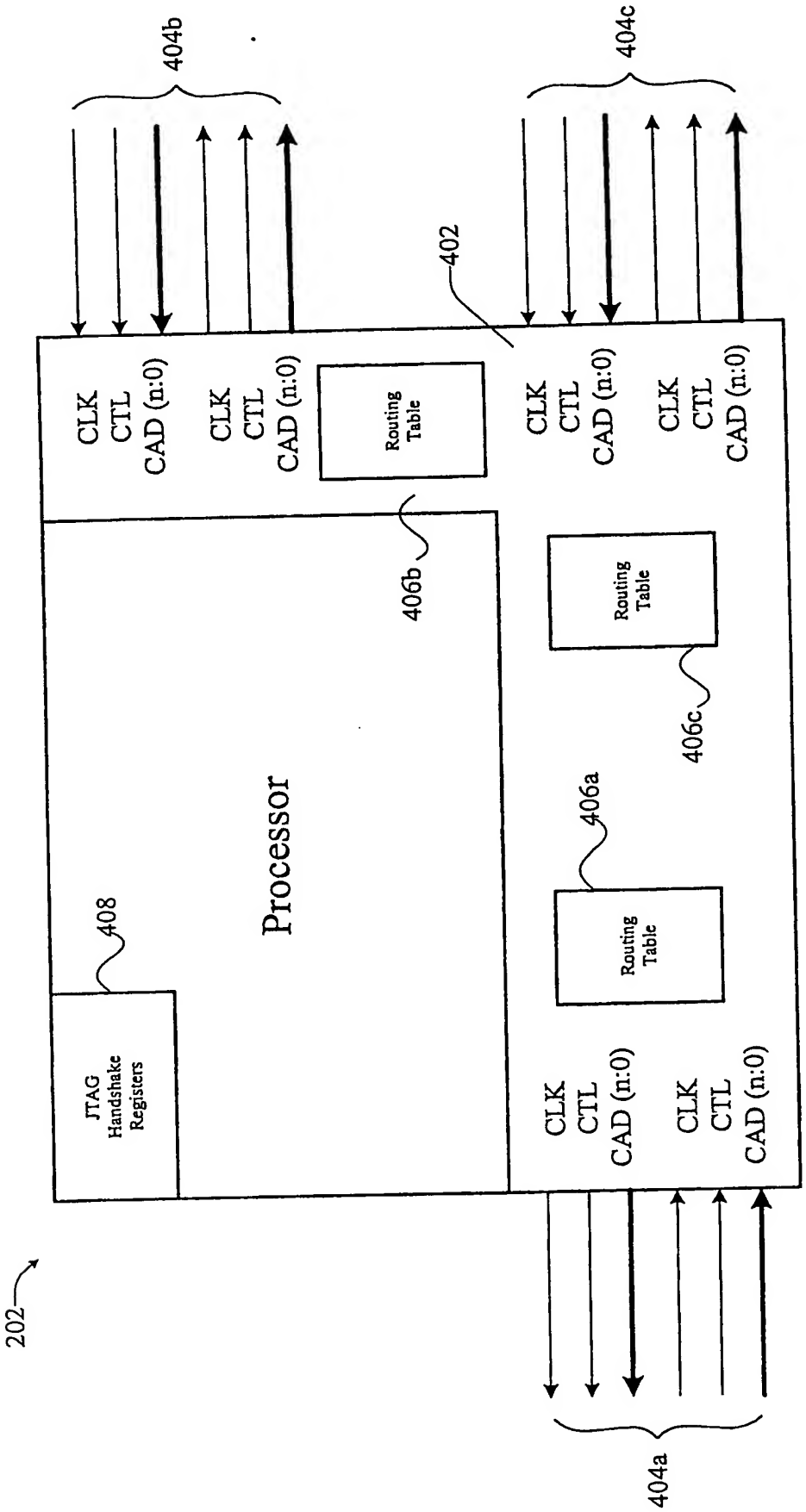


Fig. 4

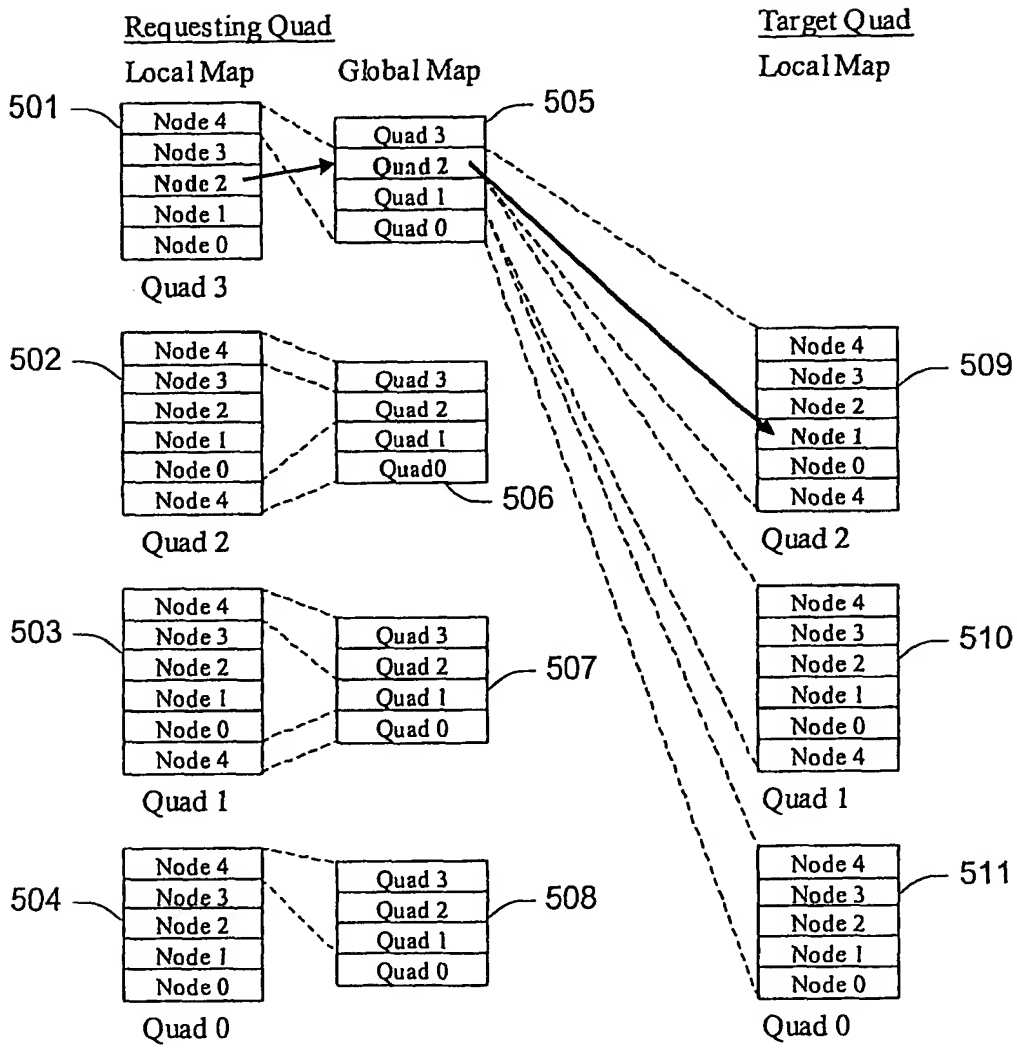

Requesting Quad
Local Map
Global Map
Target Quad
Local Map
501
Node 4
Node 3
Node 2
Node 1
Node 0
Quad 3
Quad 3
Quad 2
Quad 1
Quad 0
505
502
Node 4
Node 3
Node 2
Node 1
Node 0
Node 4
Quad 2
Quad 3
Quad 2
Quad 1
Quad0
506
503
Node 4
Node 3
Node 2
Node 1
Node 0
Node 4
Quad 1
Quad 3
Quad 2
Quad 1
Quad 0
507
504
Node 4
Node 3
Node 2
Node 1
Node 0
Quad 0
Quad 3
Quad 2
Quad 1
Quad 0
508
509
Node 4
Node 3
Node 2
Node 1
Node 0
Node 4
Quad 2
510
Node 4
Node 3
Node 2
Node 1
Node 0
Node 4
Quad 1
511
Node 4
Node 3
Node 2
Node 1
Node 0
Quad 0

Fig. 5

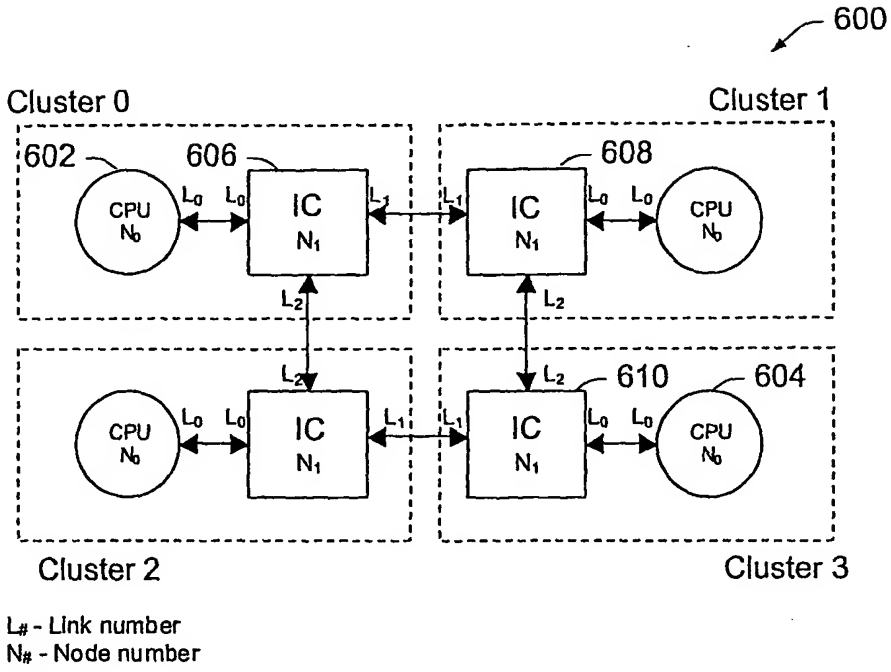


Fig. 6A

		Local Table		Global Table			
		Dest Node		Dest Cluster			
Source		N_0	N_1	C_0	C_1	C_2	C_3
Cluster 0	Node 0	X	L_0	NA	NA	NA	NA
	Node 1	L_0	X	X	L_1	L_2	L_1
Cluster 1	Node 0	X	L_0	NA	NA	NA	NA
	Node 1	L_0	X	L_1	X	L_2	L_2
Cluster 2	Node 0	X	L_0	NA	NA	NA	NA
	Node 1	L_0	X	L_2	L_2	X	L_1
Cluster 3	Node 0	X	L_0	NA	NA	NA	NA
	Node 1	L_0	X	L_2	L_2	L_1	X

Fig. 6B

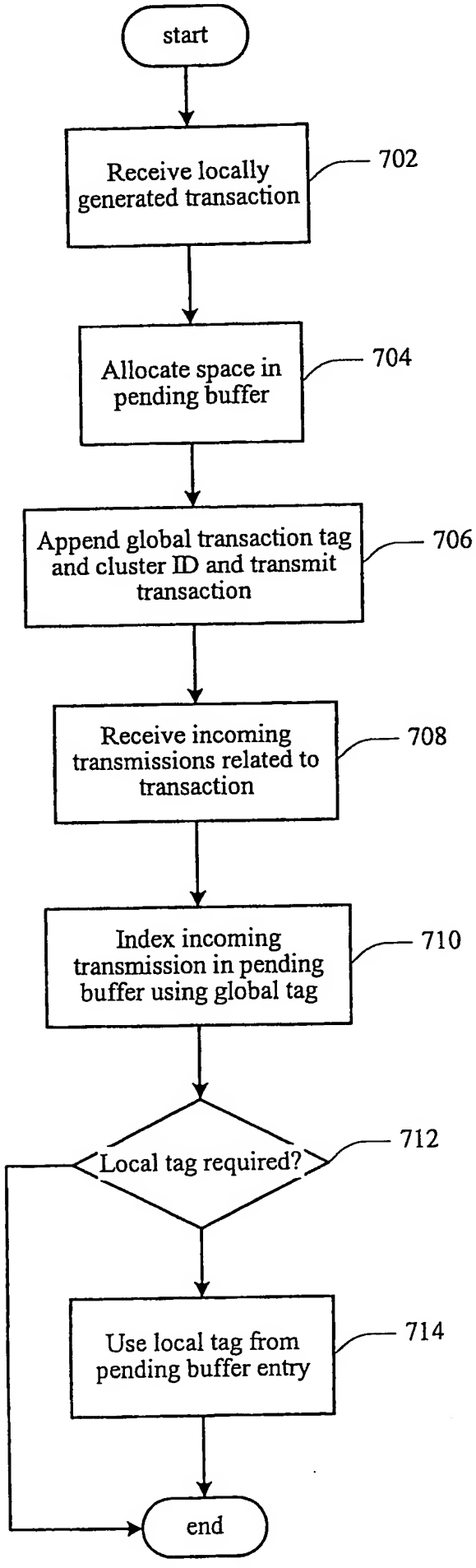

start
Receive locally generated transaction
702
Allocate space in pending buffer
704
Append global transaction tag and cluster ID and transmit transaction
706
Receive incoming transmissions related to transaction
708
Index incoming transmission in pending buffer using global tag
710
Local tag required?
712
Use local tag from pending buffer entry
714
end

Fig. 7

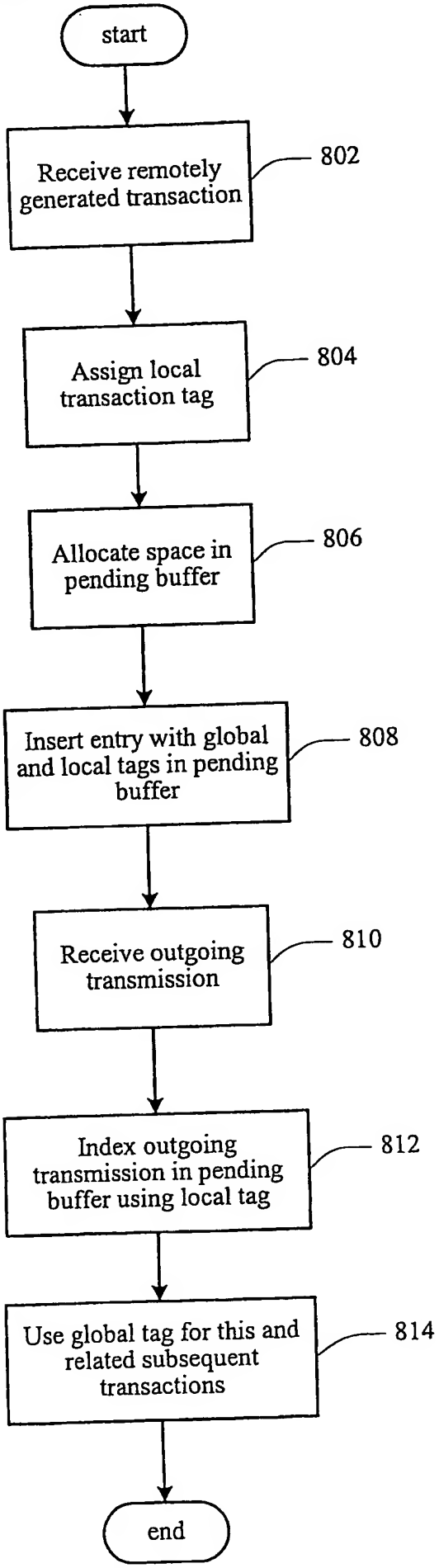
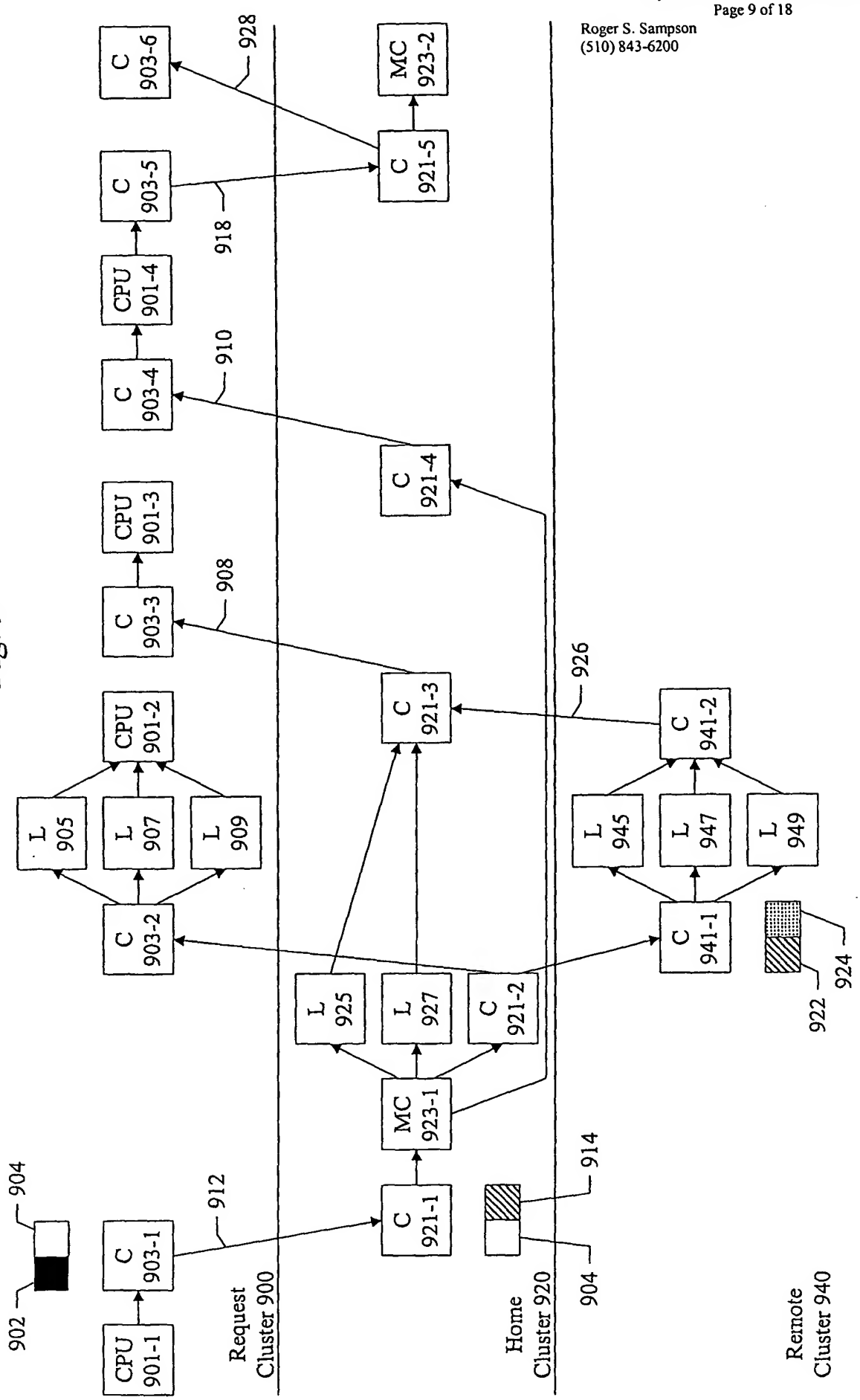

start
Receive remotely generated transaction
802
Assign local transaction tag
804
Allocate space in pending buffer
806
Insert entry with global and local tags in pending buffer
808
Receive outgoing transmission
810
Index outgoing transmission in pending buffer using local tag
812
Use global tag for this and related subsequent transactions
814
end

Fig. 8

Roger S. Sampson
(510) 843-6200

Fig. 9



Roger S. Sampson
(510) 843-6200

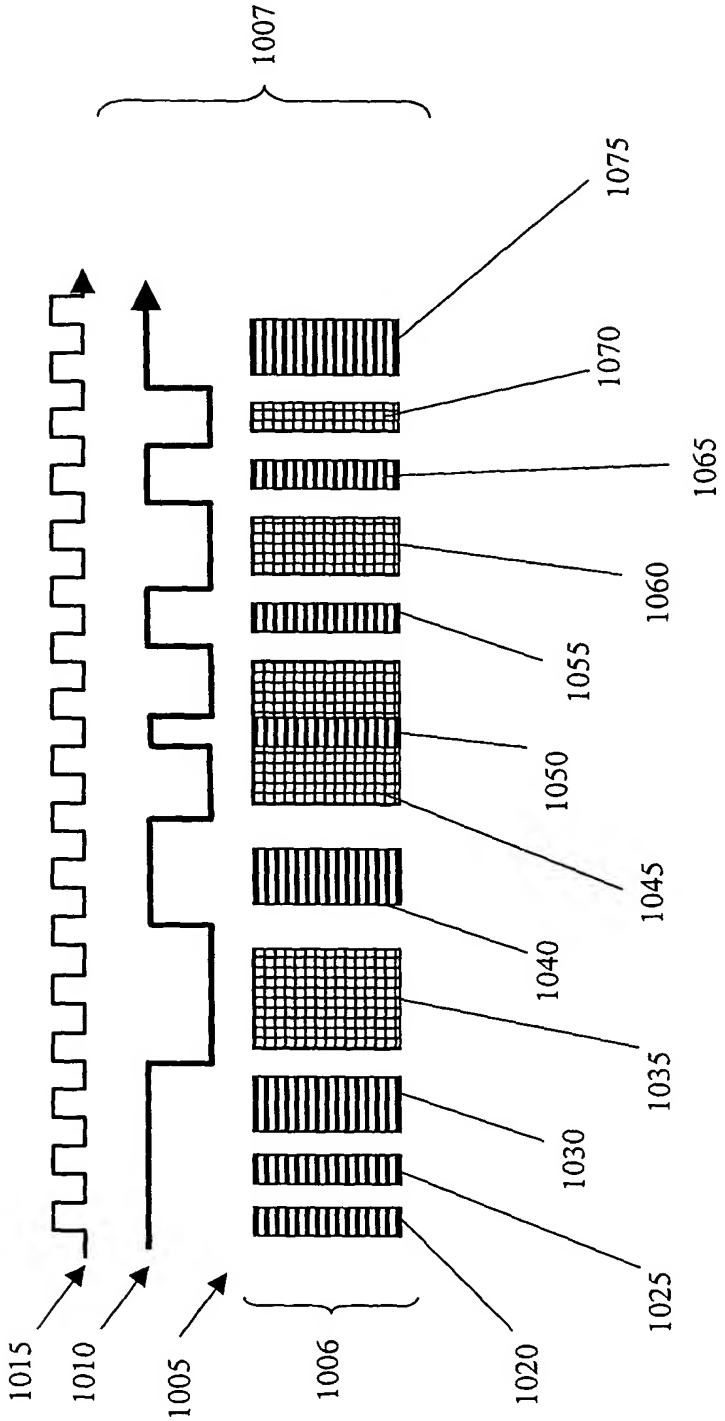


Fig. 10

Roger S. Sampson
(510) 843-6200

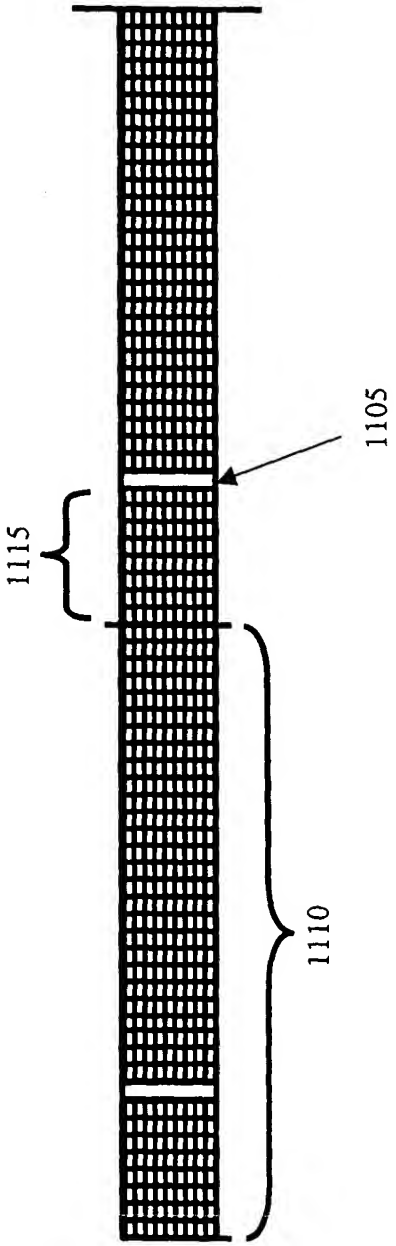


Fig. 11A

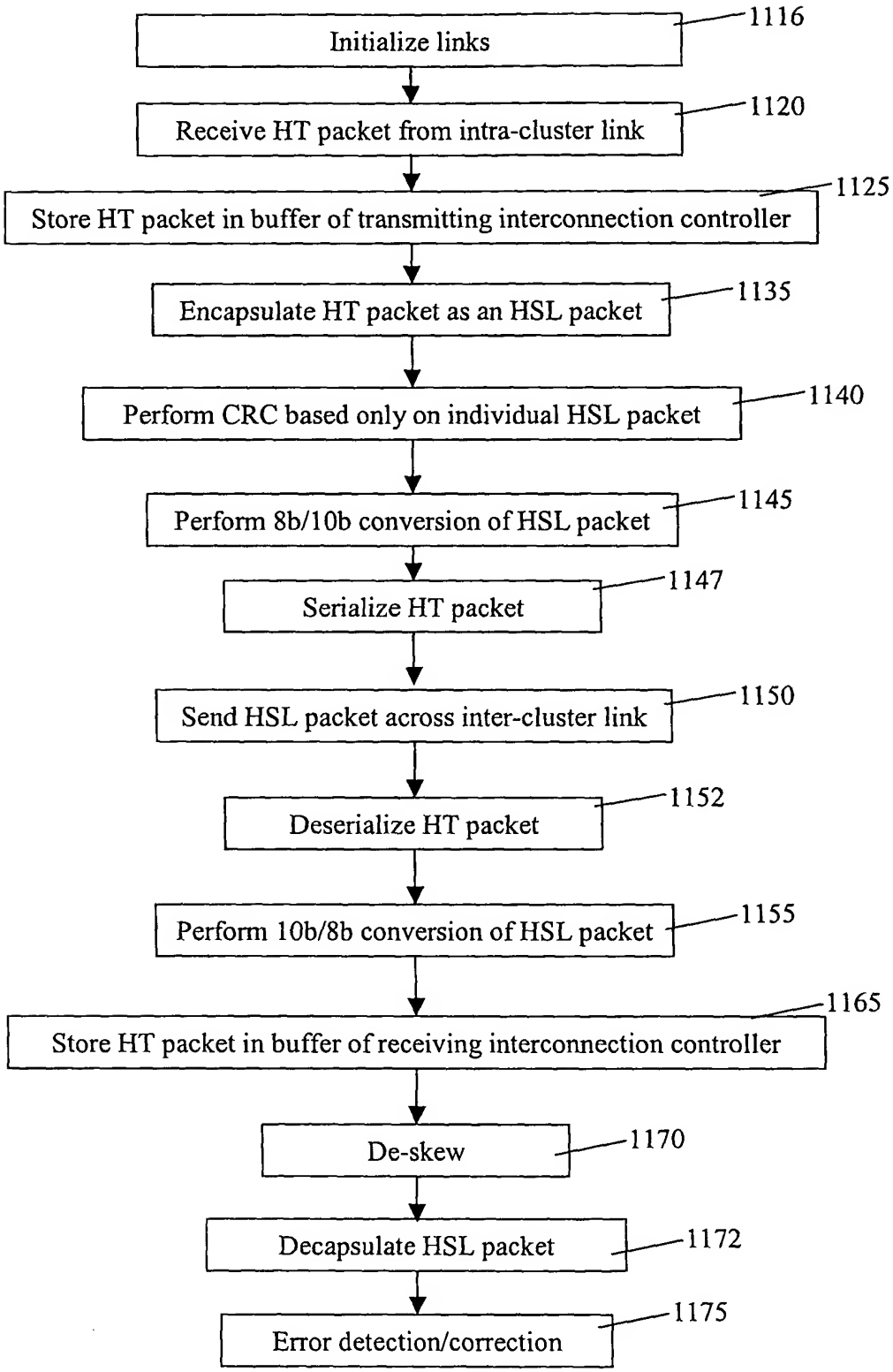

Initialize links
1116
Receive HT packet from intra-cluster link
1120
Store HT packet in buffer of transmitting interconnection controller
1125
Encapsulate HT packet as an HSL packet
1135
Perform CRC based only on individual HSL packet
1140
Perform 8b/10b conversion of HSL packet
1145
Serialize HT packet
1147
Send HSL packet across inter-cluster link
1150
Deserialize HT packet
1152
Perform 10b/8b conversion of HSL packet
1155
Store HT packet in buffer of receiving interconnection controller
1165
De-skew
1170
Decapsulate HSL packet
1172
Error detection/correction
1175

Fig. 11B

Roger S. Sampson
(510) 843-6200

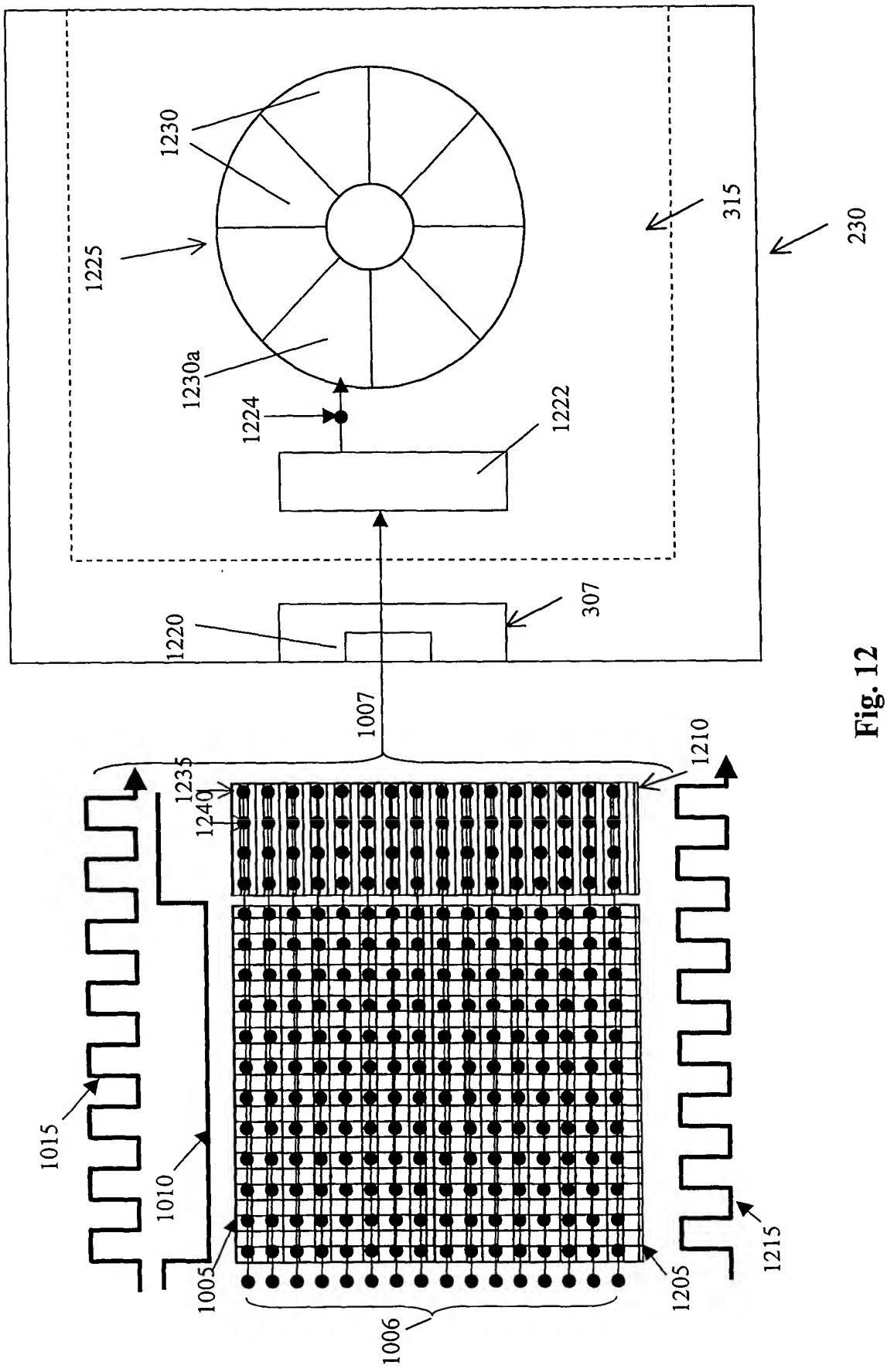


Fig. 12

Roger S. Sampson
(510) 843-6200

32b HT packet	32 b ACK/NACK packet	6b SeqID	2b PT	12b Remote bits	12b CRC12

Fig 13A: Protocol Packet- 32b Control

32b (31:0) HT packet	32 b (63:32) HT packet	6b SeqID	2b PT	12b Remote bits	12b CRC12

Fig 13B: Protocol Packet- 64b Control.

32b Data	32 b unused	6b SeqID	2b PT	8b Packet length	16b CRC16

Fig. 13C: Data Packet- 32b.

32b (31:0) Data	32 b (63:32) Data	6b SeqID	2b PT	8b Packet length	16b CRC16

Fig. 13D: Data Packet- 64b.

32b (31:0) Data	32 b (63:32) Data	6b SeqID	2b PT	8b Packet length	16 b unused
32b (95:64) Data	32 b unused	16b unused			16b CRC16

Fig 13E: Data Packet- 96b.

32b (31:0) Data	32 b (63:32) Data	6b SeqID	2b PT	8b Packet length	16 b unused
32b (95:64) Data	32b (127:96) Data	16b unused			16b CRC16

Fig 13F: Data Packet- 128b.

32b (31:0) Data	32 b (63:32) Data	6b SeqID	2b PT	8b Packet length	16 b unused
32b (95:64) Data	32b (127:96) Data	32 b (159:128) Data			
32 b unused	32 b unused	16b unused			16b CRC16

Fig 13G: Data Packet- 160b.

32b (31:0) Data	32 b (63:32) Data	6b SeqID	2b PT	8b Packet length	16 b unused
32b (95:64) Data	32b (127:96) Data	32 b (159:128) Data			
32 b (191:160) Data	32 b unused	16 b unused			16b CRC16

Fig 13H: Data Packet- 192b.

32b (31:0) Data	32 b (63:32) Data	6b SeqID	2b PT	8b Packet length	16 b unused
32b (95:64) Data	32b (127:96) Data	32 b (159:128) Data			
32b (191:160) Data	32b (223:192) Data	32 b (255:224) Data			
32b (303:272) Data	32b (335:304) Data	32 b (367:336) Data			
32b (383:368) Data	32b (415:384) Data	32 b (447:416) Data			
32b (479:448) Data	32b (511:480) Data	16 b unused			16b CRC16

Fig 13I: Data Packet- 512b.

Command	8b Rsv	8b Rsv	1b Rsv	SeqID	1b Valid

Fig 13J: ACK/NACK Packet Format.

Roger S. Sampson
(510) 843-6200

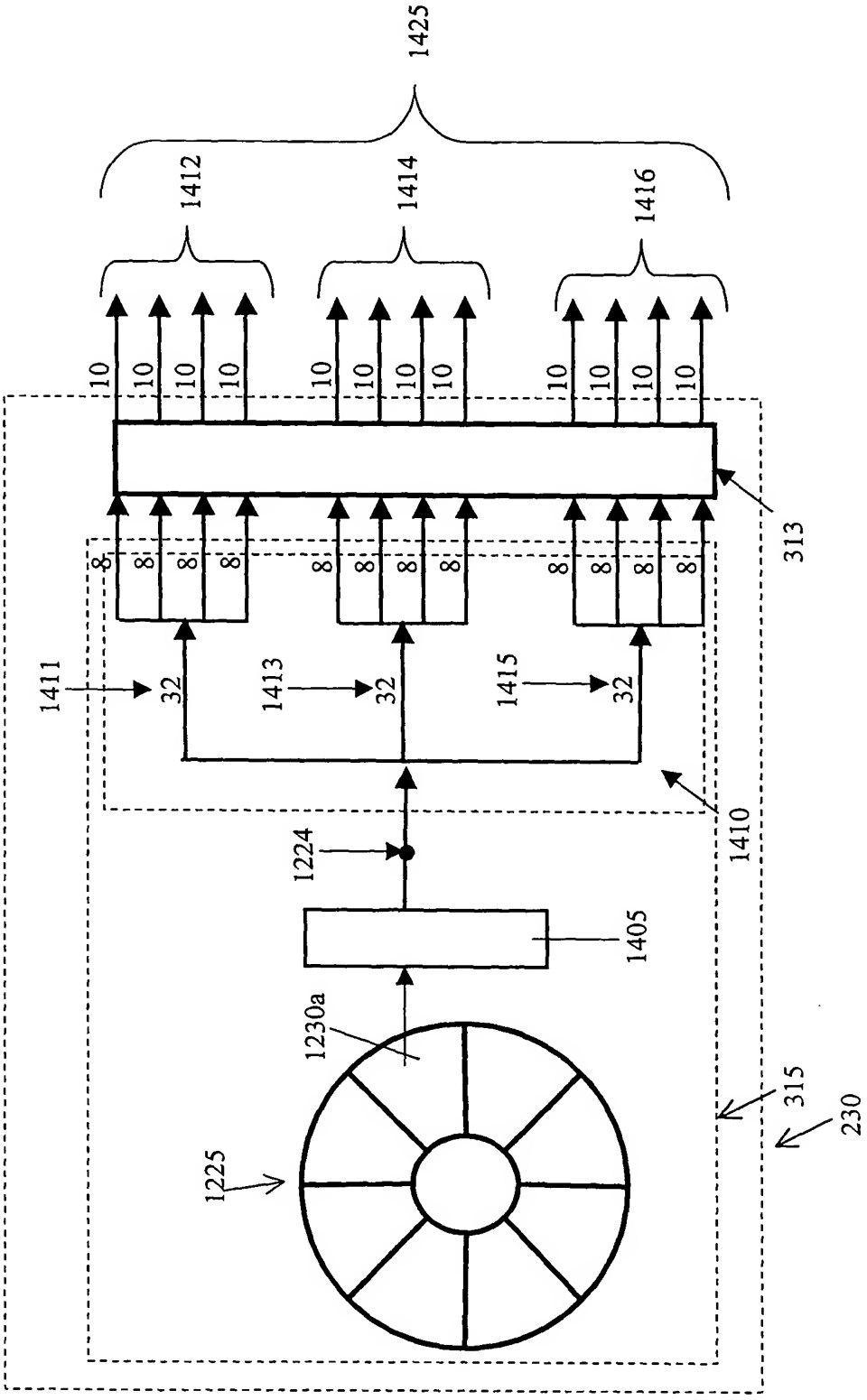


Fig. 14

Roger S. Sampson
(510) 843-6200

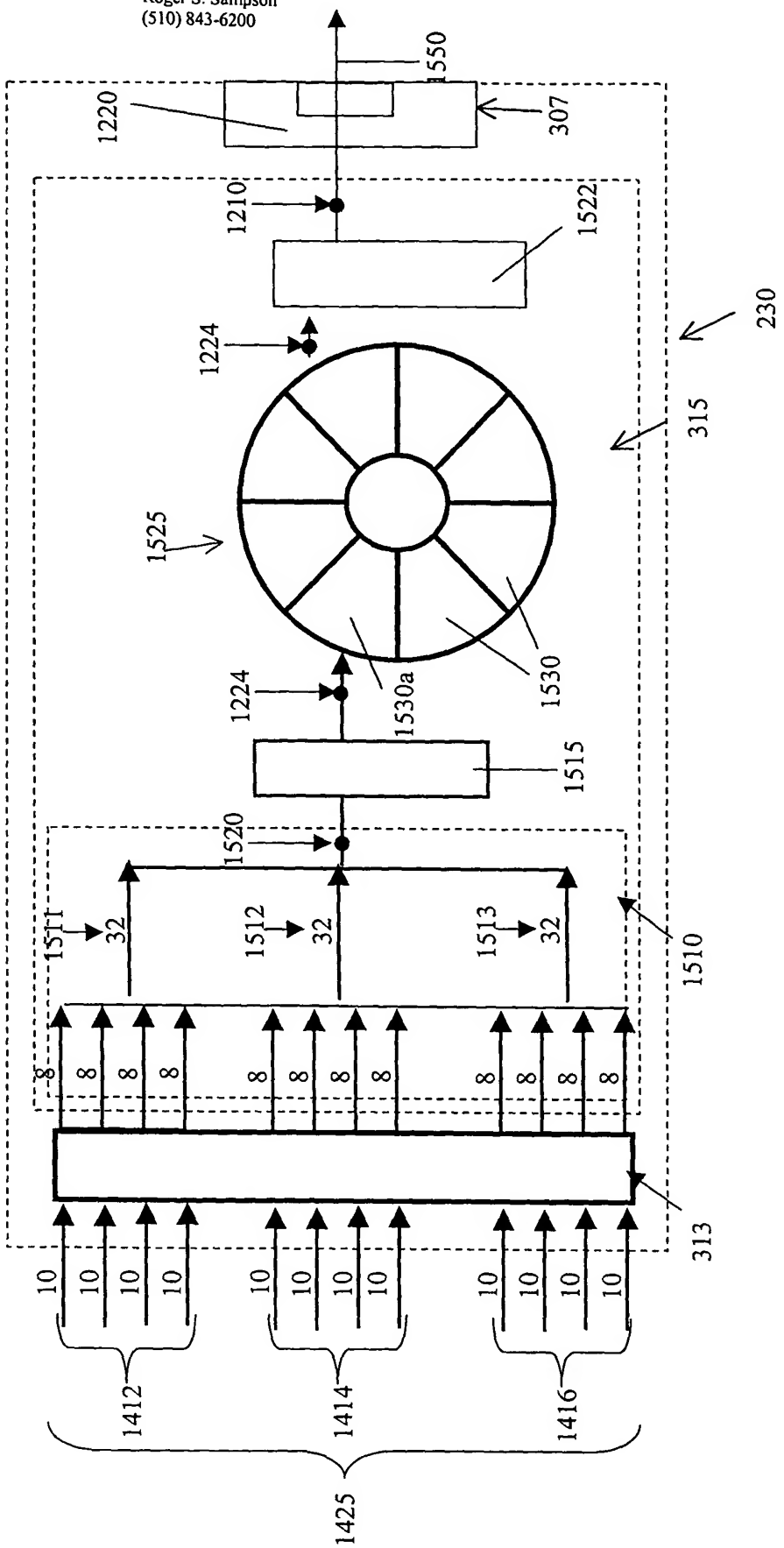


Fig. 15

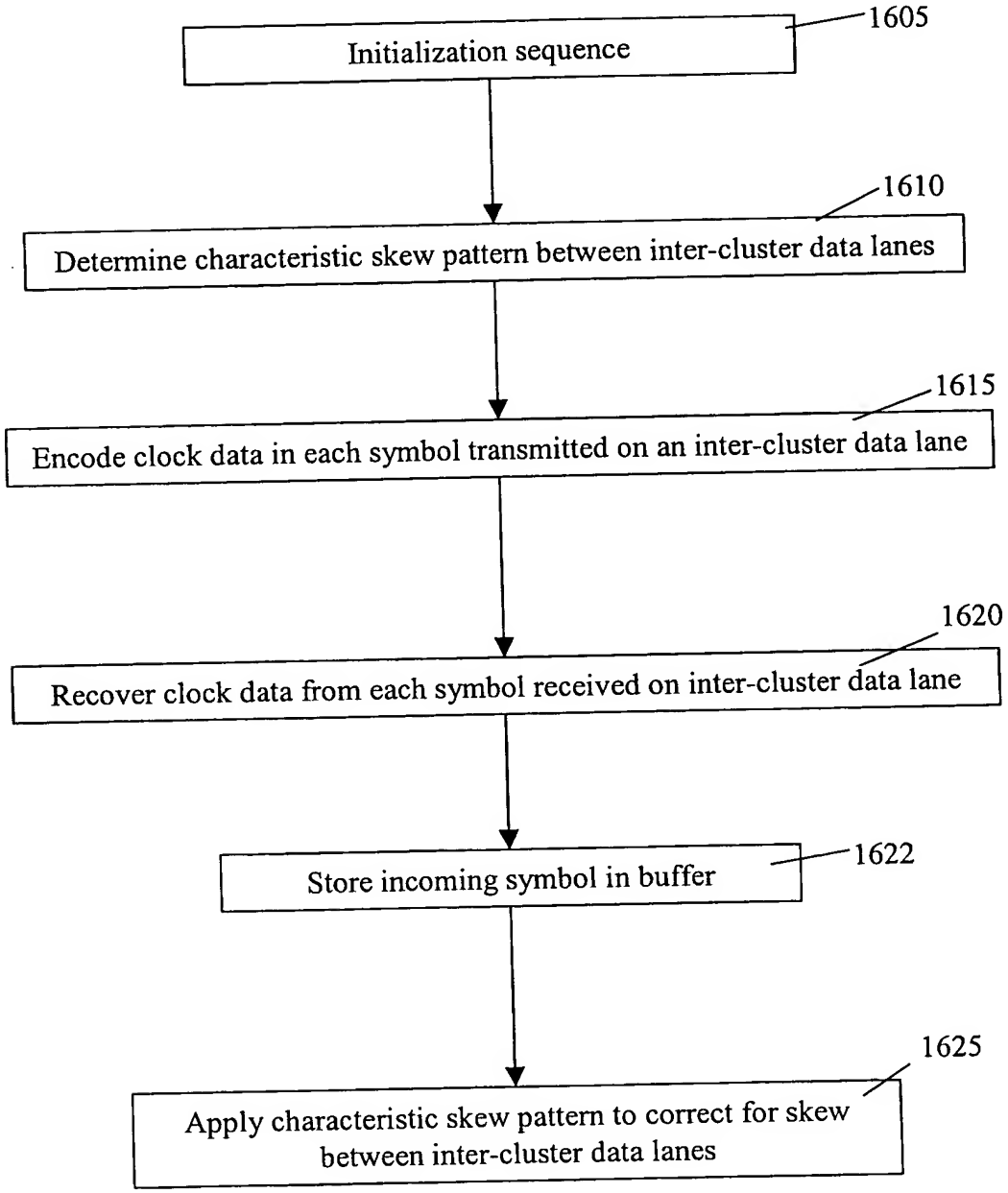

Initialization sequence
1605
Determine characteristic skew pattern between inter-cluster data lanes
1610
Encode clock data in each symbol transmitted on an inter-cluster data lane
1615
Recover clock data from each symbol received on inter-cluster data lane
1620
Store incoming symbol in buffer
1622
Apply characteristic skew pattern to correct for skew between inter-cluster data lanes
1625

Fig. 16